

**Overview of Research
In the USDA Infectious Bacterial Diseases Unit**

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**Workshop: An Integrated Approach to Controlling Brucellosis
in Africa, Addis Ababa, 29-31 January 2013**



USDA Animal Health Facilities and Expertise

State-of-the-art:

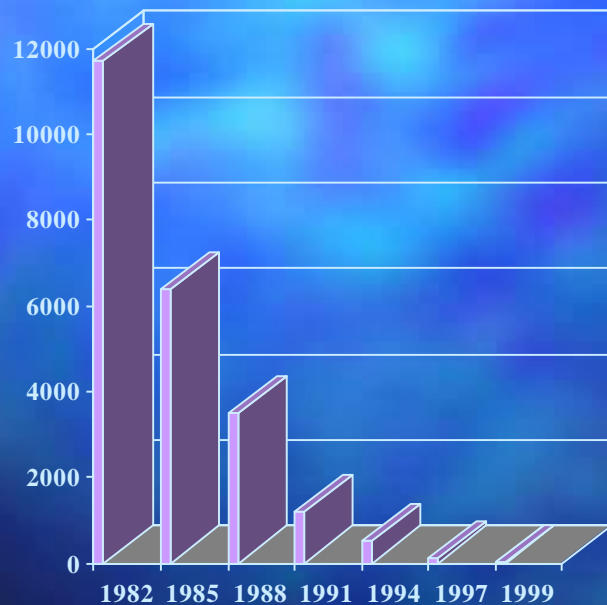
- ABSL2 and ABSL3 small and large animal facilities
- BSL3 Agriculture large animal facility



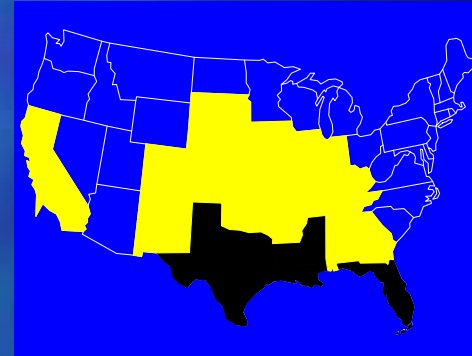
Animal care and facilities operations expertise that supports high-containment research in all major livestock and several wildlife species



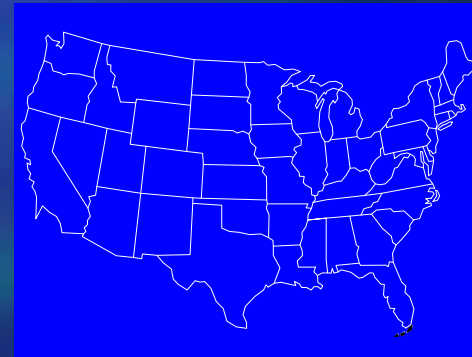
Cattle Brucellosis (*Brucella abortus*) in the United States



1991



2011



Lipopolysaccharide structure of virulent and vaccine strains

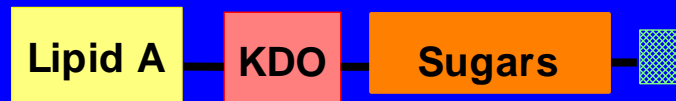
Brucella abortus field strains



Brucella abortus strain 19



Brucella abortus strain RB51



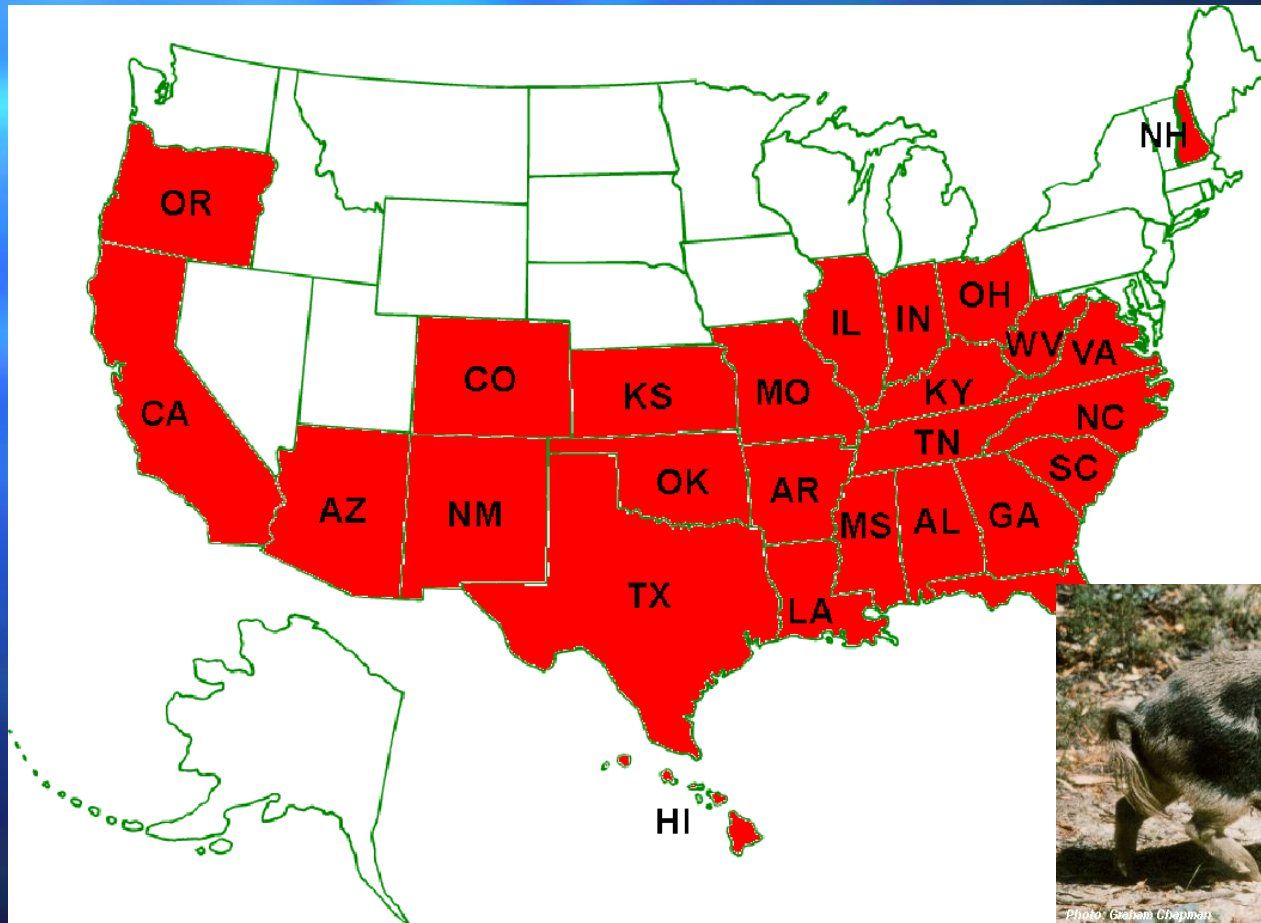
The O-side chain is the immunodominant antigen of *Brucella* for antibody responses



Efficacy of RB51 as a Calfhood Vaccine for Cattle

Age at Vaccination	Protection from abortion % protected (# aborted/ #challenged)		
	RB51	Strain 19	Control
10 months	100% (0/20)	100% (0/6)	45% (6/11)
7 months	100% (0/22)	100% (0/5)	63% (4/11)
5-6 months	92% (2/25)	100% (0/4)	57% (6/14)
3 months	87% (2/15)	100% (0/4)	50% (5/10)
Overall	95% (4/82)	100% (0/19)	54% (21/46)

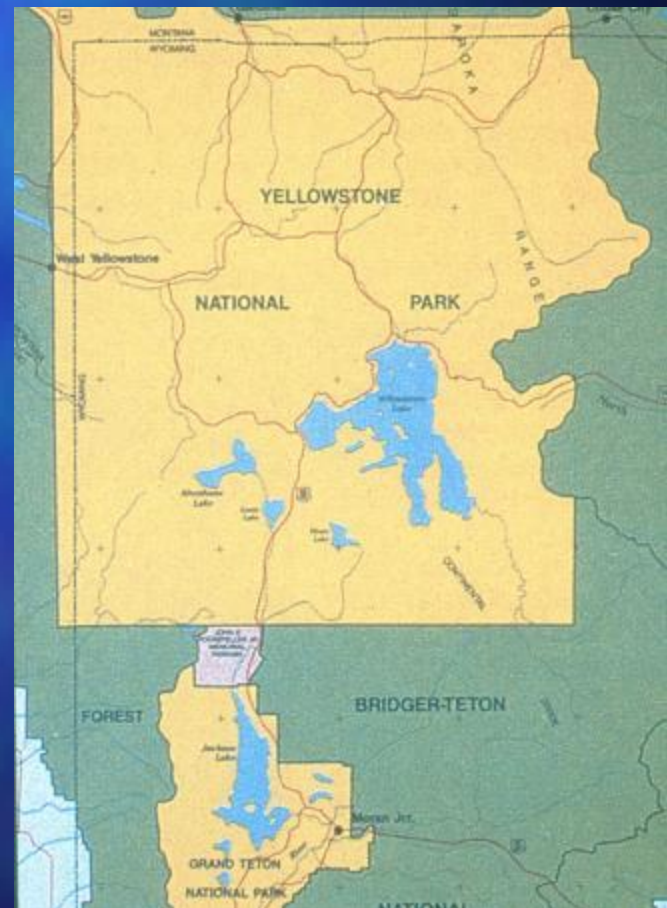
Distribution of Feral Swine in the US



GPS mapping at <http://128.192.20.53/infsmms/>



Brucellosis in the Greater Yellowstone Area (GYA)



Variance in Immunologic Responses between Ruminants



≠

≠

≠

VNTR Assay for Epidemiologic Tracebacks

“Lysine decarboxylase”

Ab	GAAGATGTGA	GGAGTAGGGC	AGTAGGGC	AGT::: : :	: : : : : :	: : : : : :	: : : : AAAGA
Me1	GAAGATGTGA	GGAGTAGGGC	AGT::: : :	: : : : : :	: : : : : :	: : : : : :	: : : : AAAGA
Suis	GAAGATGTGA	GGAGTAGGGC	AGTAGGGC	AGTAGGGC	AGTAGGGC	AGTAGGGC	AGTAAAGA

Alleles (number of repeat units per locus)

14
13
12
11
10
9
8
7
6
5
4
3
2
1

■ VNTR-1 ■ VNTR-2 ■ VNTR-3 ■ VNTR-4 ■ VNTR-5 ■ VNTR-6 ■ VNTR-7 □ VNTR-8 ■ VNTR-9 ■ VNTR-10

So. California

So. Florida

Cent. Florida

Cent. Florida

Cent. Florida

Arkansas

Alabam

Kansas

Oklahoma

Elk-MT

Elk-WY

Bison-MT

